Unlabeled Stamp Foldings

As you've seen, a nice problem in combinatorics is to list the number of ways to fold a strip of *n* stamps into a stack one stamp wide and *n* stamps tall. For example, if the stamps are different, two stamps can be folded in two ways:

But if the stamps are blank, there's really only one shape:

Likewise, three distinct stamps can be folded in six ways:

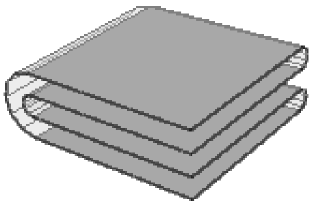
But there are only two basic shapes: the first labeled folding is the same as the last one upside down, and the second one is the same as the next three flipped horizontally or vertically or both:

For four stamps, five basic shapes:

Five stamps, fourteen shapes:

There doesn't seem to be a closed-form formula for computing these counts, either. The first few terms look like the Catalan numbers, but larger numbers don't match up; see OEIS A001011.

For a 2×2 sheet of stamps, there are 8 distinct foldings, but they're all the same shape.



If you kind of liked this, you'll kind of love labeled stamp foldings and map foldings.

See Martin Gardner, *Wheels, Life and Other Mathematical Amusements*, pp. 60–61, 1983.

Figures created with *Mathematica 7*.

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www.robertdickau.com/unlabeledfoldings.html